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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,451	03/26/2004	Tetsuro Mizushima	119237	7669

25944 7590 08/07/2007
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EXAMINER	
VERDERAME, ANNA L	

ART UNIT	PAPER NUMBER
1756	

MAIL DATE	DELIVERY MODE
08/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,451	MIZUSHIMA, TETSURO	
	Examiner	Art Unit	
	Anna L. Verderame	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *27 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06/11/2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. The response provided by the applicant has been read and given careful consideration. Responses to the arguments and amendments of the applicant are presented after the first rejection to which they are directed. The certified translation of the foreign priority document has been received and has overcome rejections found in the prior office actions which depended upon the teachings of Tseng et al. 2004/0219455.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

3. Claims 1-3, 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Kasai et al. 4,214,249.

In example 2 Kasai et al. an optical recording medium comprising a metal dispersed chalcogenide recording material. Silver was used as a diffusible metal and an Ag layer of about 20 nm was formed on the Ge_2S_3 recording film which had been formed on a polyester sheet. A blanket light irradiation was applied to the $Ag+Ge_2S_3$ bi-layer to diffuse the Ag of the diffusible metal layer completely and mutually into the Ge_2S_3 layer so that an Ag-Ge-S chalcogenide glass was prepared. An image recording was carried out with respect to the chalcogenide glass recording member by using an

argon laser(output 200 mW, wavelength of 488nm)(13/11). In addition, copper was employed as a diffusible metal in place of Ag as mentioned above and vacuum-deposited on the Ge_2S_3 film in a similar manner and blanket light irradiation was applied thereto to prepare a Cu-Ge-S chalcogenide glass(13/55-14/26). Chalcogenides listed in the table at (13/45-50) were also used.

Kasai teaches the use of other chalcogens such as As-S, Ge-S, As-S-Ge, Ge-Se, and others. The reactivity of chalcogen elements is similar to each other so that the various chalcogenides obtained by modifying the above exemplified chalcogenides by changing the chalcogen elements can be effectively used (5/25-49). It is also effective to incorporate to the non-metallic (chalcogenide) layer, a minor amount of metal as an additive for the purpose of improving light sensitivity and the optical density. Representative metal additives may be Ag, Cu, Cd, Mn, Ga, In, Bi, Sb, Fe, Ni and alloys thereof. Ag and Cu are most preferable. The amount of the metal additive may be 1-0.0001 atoms per 100 atoms constituting the non-metallic (chalcogenide) layer. Usually, 0.5-0.005 atoms per 100 atoms are preferable (5/62-6/2).

In regard to the limitation in claim 1 that the content of the metal particle is at least 0.1 vol % and less than 2 vol%, it is held that the teachings of Kasai meets these limitations for the following reasons(which were discussed in the June 6 interview):
Kasai teaches 0.0001-1 metal atoms per 100 atoms of chalcogenide and more preferably 0.5-0.005 metal atoms per 100 atoms of chalcogenide.

Ag^{+}-1.26 angstroms

S^{2-}-1.84 angstroms

Ge^{2-}2.57 angstroms

GeS-2.57 angstroms

This is approximately a 2:1 ratio (volume of GeS:volume or Ag^{+}).

Example: A film formed according to the teachings of Kasai having one silver atom per 100 atoms of GeS yields a film having 0.49 vol% Ag. This is within the range of 0.1 vol % and 2 vol % recited in claim 1.

In regard to the limitation that the metal particles have a particle size of less than 35 nm, it is held that the teachings of Kasai meet these limitations for the following reasons:

Ag^{+}- radius of 1.26 angstroms=0.126 nm

A particle having a size of 35nm can contain 277.7 silver ions.

Based on this it is held that the particles dispersed in the chalcogenide glass will have a particle size of 35 nm or less.

In regard to the limitation of claim 21 that the particle size be "no greater than 20 nm" it is held that the teachings of Kasai meet this limitation for the following reasons: a particle having a size of 20 nm contains 158.7 silver ions(atoms). Based on this it is held that the particles dispersed in the chalcogenide glass will have a particles size of 20 nm or less.

Note particle size is interpreted to the radius of the particle.

In regard to the limitation in claim one that "the metal particles be dispersed in the glass _prior to a process of recording_ *material* by irradiation of light", the examiner refers to example 2 of Kasai et al. The step where a blanket light irradiation was

applied to the Ag+Ge_2S_3 vacuum-deposited film as shown in Fig 5. by means of a xenon lamp to diffuse the Ag of the diffusible metal layer completely and mutually into the Ge_2S_3 so that an Ag-Ge-S chalcogenide glass was prepared(13/61-67), is separate and distinct from the step of image recording with respect to the thus formed chalcogenide glass (14/1-16). Therefore, it is held that the chalcogenide glass containing dispersed metal particles is formed before the recording step. See also figures 5-6. As further evidence for two separate steps, note different light sources used. Xenon lamp used for formation of Ag-Ge-S glass, and Argon laser(488 nm(1/20λ=~24 nm)) used for recording (14/3 and 13/10-11).

Kasai teaches use of a short wavelength such as from and Argon laser (488nm) for writing and the use of a long wavelength such as from a He-Ne laser (630 nm) for reading (reproducing) the data(7/20-30).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasai et al. 4,214,249 in view of Li et al. 6,890,790.

Kasai et al. does not teach the limitation of forming the metal chalcogenide film by co-depositing the metal and the chalcogenide.

As prior art Li et al. teaches the photodissolution technique used by Kasai et al(1/60-2/17). He notes drawbacks of this technique including speed and control of the amount of photodiffused silver in the film. Li offers a co-sputtering technique as a favorable alternative to photodissolution.

Li et al. '790 teaches the advantages of co-sputtering metal and chalcogenide glass. Co-sputtering allows for relatively precise and efficient control of a constituent ratio between the doping metal and the chalcogenide glass. Further, it allows for a high degree of uniformity over the depth of the formed layer of chalcogenide glass and metal. Also, metal concentration can be varied in a controlled manner along the film depth(abstract). Doping metals include Ag, Cu, and Zn. Examples of chalcogenide glasses that can be use include Ge_xS_{1-x} and As_xS_{1-x} (2/45-50).

Co-sputtering involves the Co-deposition of substances, in this case a chalcogenide and a metal, in order to form a mixed substance film.

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the chalcogenide film taught by Kasai et al. having metal particles uniformly dispersed therein using the co-sputtering method taught by Li et al. instead of the photodissolution method employed by Kasai et al. with the expectation of obtaining the benefits taught by Li et al. such as speed of formation and control as taught by Li et al. at (1/60-2/17).

6. Claims 13-16,19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasai et al. 4,214,249 in view of Inoue et al. 3,825,217 and Slinger et. al.

"photodoped chalcogenides as potential infrared holographic media", Applied Optics Vol 31(14) pp.2490-2498 (05/1992).

This was rejection 8 in the prior office action mailed on 02/09/2007.

7. Claims 1-3, 5-12, 17-18, and 21-22 are rejected under 35 U.S.C 103(a) as being unpatentable over Kasai et al. 4,214,249 in view of Inoue et al. 3,907,566.

Kasai et al. teaches the particle size limitations recited in the instant application for the reasons recited above. This rejection is presented as an alternative to the strong rejection presented above.

Inoue et al. '566 teaches a chalcogenide-metal glass. Representative chalcogens include As-Se systems, Ge-S systems, S-Si systems, As-Se-Ge systems, As-S-Se systems and others. Metals include Ag or Cu or alloys containing Ag and or Cu (5/63-6/15). The composition ratio of the photosensitive particles is selected depending upon the use of the pattern to be formed. In general, 0.01-50 parts by weight metal is preferably used for 100 parts by weight of the photosensitive particle. Particle size of the photosensitive particle is selected depending upon the resolving power required in each usage of the photosensitive member. In general the particle size preferably ranges from 0.01-20 microns(10-2000 nm).

It would have been obvious to one of ordinary skill in the art to modify the example of Kasai et al. by using a chalcogenide-metal film having metal particles having diameters similar to those used in Inoue et al. '566 and with the reasonable expectation of forming a useful recording material.

The applicant argues that the reference teaches that the photosensitive particle is not a solid metal particle but instead is metal coated inorganic material such as As_2Se_3(2/27-3/9). This statement is correct. The applicant further argues that therefore the metal coated inorganic particle is not the same as a metal particle. This statement is incorrect. The two important properties of the metal particles in this invention are their size and their reflectivity. Size of the metal particle is taught and it is held that the reflectivity of a metal particle having a metallic core and a metal particle having a core comprised of an inorganic material will be the same. In addition, there is certainly a cost benefit achieved by coating an inorganic material with silver and/or copper instead of having the whole particle be made of silver and/or copper.

Examples one and two of Inoue '566 teaches the formation of silver coated As_2S_3 particles. See example 4(includes control) in which the silver coated inorganic particles are coated on a glass plate to form a photosensitive member. See also description of state of the art at the time of the invention which is similar to the disclosure of Kasai et al. (1/20-2/40).

The examiner notes that in section D of the response the attorney traverses a rejection made over Inoue 3,825,817, but then goes on to recite evidence from Inoue 3,907,566 as the reason for his traversal.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna L. Verderame whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALV AV

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